

U.S. Application No.  
To be assigned

International Application No.  
PCT/BE99/00077

Attorney Docket No.  
VANM194.001APC

Date: December 14, 2000

09/719917  
430 Rec'd PCT/PTO 14 DEC 2000

**TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 USC 371**

International Application No.: PCT/BE99/00077  
International Filing Date: June 17, 1999  
Priority Date Claimed: June 17, 1998  
Title of Invention: METHOD FOR MAKING A MICACEOUS PRODUCT PREFERABLY IN  
THE FORM OF A MICA RIBBON AND RESULTING PRODUCT  
Applicant(s) for DO/EO/US: Alain Jacques and Noël Mortier

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. (X) This is a **FIRST** submission of items concerning a filing under 35 USC 371.
2. (X) This express request to begin national examination procedures (35 USC 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 USC 371(b) and PCT Articles 22 and 39(1).
3. (X) A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
4. (X) A copy of the International Application as filed (35 USC 371(c)(2))
  - a) ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b) ☒ has been transmitted by the International Bureau.
  - c) ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
5. (X) A translation of the International Application into English (35 USC 371(c)(2)).
6. (X) Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3))
  - a) ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b) ☐ have been transmitted by the International Bureau.
  - c) ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d) ☒ have not been made and will not be made.
7. (X) A copy of the International Preliminary Examination Report with any annexes thereto, such as any amendments made under PCT Article 34.
8. (X) A translation of the annexes, such as any amendments made under PCT Article 34, to the International Preliminary Examination Report under PCT Article 36 (35 USC 371(c)(5)).

**Items below concern other document(s) or information included:**

9. (X) An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
10. (X) A FIRST preliminary amendment.

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11. (X) International Application as published.
12. (X) PCT Form PCT/IB/308.
13. (X) International Search Report.
14. (X) A return prepaid postcard.
15. (X) The following fees are submitted:

|                     |                 |                 |      | FEES  |
|---------------------|-----------------|-----------------|------|-------|
| BASIC FEE           |                 |                 |      | \$860 |
| CLAIMS              | NUMBER<br>FILED | NUMBER<br>EXTRA | RATE |       |
| Total Claims        | 27 - 20 =       | 7 ×             | \$18 | \$126 |
| Independent Claims  | 2 - 3 =         | 0 ×             | \$80 | \$ 0  |
| TOTAL FEES ENCLOSED |                 |                 |      | \$986 |

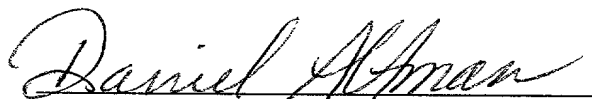
16. (X) The fee for later submission of the signed oath or declaration set forth in 37 CFR 1.492(e) will be paid upon submission of the declaration.
17. (X) A check in the amount of \$950 to cover the above fees is enclosed.
18. (X) The Commissioner is hereby authorized to charge only those additional fees which may be required, now or in the future, to avoid abandonment of the application, or credit any overpayment to Deposit Account No. 11-1410. A duplicate copy of this sheet is enclosed.

SEND ALL CORRESPONDENCE TO:

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VANM194.001APC

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Alain Jacques et al. ) Group Art Unit Unknown  
Int'l Appl. No. : PCT/BE99/00077 )  
Int'l Filed : June 17, 1999 )  
For : METHOD FOR MAKING A )  
MICACEOUS PRODUCT )  
PREFERABLY IN THE FORM )  
OF A MICA RIBBON AND )  
RESULTING PRODUCT )  
Examiner : Unknown )

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Prior to examination on the merits, please amend the above-captioned U.S. national phase application as follows:

IN THE SPECIFICATION:

On page 1 of the specification, after the title of the invention ending on line 2 and before "Subject of the invention" on line 4, please insert--This is the U.S. national phase under 35 U.S.C. § 371 of International Application PCT/BE99/00077, filed June 17, 1999.

On page 11, please cancel the word "CLAIMS" and substitute in its place--WHAT IS CLAIMED IS--.

**IN THE CLAIMS:**

Please amend the claims as indicated below:

1. (Amended) A [P]process for preparing a micaceous product comprising a support and a mica sheet capable of being impregnated [, which is preferably in the form of a mica tape obtained by combining at least one support and a mica sheet, characterized in that:], said process comprising:

[the support or the mica sheet is coated] coating a component of said micaceous product with at least one [a] solvent-free resin [or a mixture of solvent-free resins], with [the] an aid of several coating rollers at a working temperature for [the] a coating operation of between 40°C and 200°C[.];

[the support is combined] combining the support with the mica sheet[.]; and

[they are subjected] subjecting said support and said mica sheet to a pressure and temperature treatment; thereby

preparing said micaceous product.

2. (Amended) The [P]process according to Claim 1, [characterized in that] wherein the [coating] working temperature for the coating operation is [precisely] adjusted so as to obtain [finally] a micaceous product [whose] with a resin content [is] of between 1% and 10% [and preferably between 4% and 8%] relative to the total weight of [the tape] said micaceous product.

3. (Amended) The [P]process according to Claim 1 [or 2], [characterized in that] wherein the pressure and temperature treatment is [carried out] performed at a temperature between 40°C and 200°C [for] and a pressure [of ]between 0 and 20 bar.

4. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein a small amount of impregnation resin [, optionally in solvent medium,] is incorporated into the mica sheet, prior to the coating [step] operation.

5. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein the resin [intended] for the coating operation [is a resin whose] has a melting point that is lower than the working temperature.

6. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein the resin is a solvent-free resin [preferably of silicone or epoxy type and more particularly belonging to the family of DGEBA resins].

7. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein an accelerator is incorporated into the coating resin.

8. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein an accelerator is incorporated into the mica sheet.

9. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein an accelerator is incorporated into the support.

10. (Amended) The [P]process according to [any one of the preceding claims] Claim 7, [characterized in that] wherein the accelerator is a compound selected from the group consisting of a nitrogen compound [or] and an organometallic compound.

11. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein the support [may be] is a material selected from the group consisting of a film, a fabric [or], and a felt.

12. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein the mica sheet is a mica paper.

13. (Amended) The [P]process according to [any one of the preceding claims] Claim 1, [characterized in that] wherein the mica sheet is prepared from [muscovite which may or may not have been calcinated] from a material selected from the group consisting of muscovite, phlogopite, vermiculite, synthetic mica, and a combination thereof [, from phlogopite, from vermiculite or from synthetic mica, or from a combination thereof].

14. (Amended) A [M]micaceous product capable of being impregnated [, which is preferably in the form of a mica tape,] comprising:

a support coated with a solvent-free resin; and

[combined with] a mica sheet,

[characterized in that] wherein the resin content of said micaceous product is between 1% and 10% [and preferably between 4% and 8%] relative to the total weight of [the tape] said micaceous product.

15. (Amended) A [M]micaceous according to Claim 14, **[characterized in that]** wherein the support is a fabric, comprising weft yarns and warp yarns, on which the resin deposits appear [essentially on the weft yarns at the intersection with the warp yarns] at intersections where a weft yarn of the fabric superimposes a warp yarn of the fabric.

16. (Amended) A [M]micaceous product according to Claim 15 **[characterized in that]** wherein the resin content is between 4% and 10% relative to the total weight of the tape.

17. (Amended) A [M]micaceous product according to Claim 15 **[or 16]**, **[characterized in that]** wherein the support is a fabric on which the resin deposits appear essentially on the weft yarns at the intersection with the warp yarns.

**Please add the following new claims:**

18. (New) The process according to Claim 1, wherein the micaceous product is a mica tape.

19. (New) The process according to Claim 2, wherein the resin content of the micaceous product is between 4% and 8% relative to the total weight of said micaceous product.

20. (New) The process according to Claim 4, wherein the impregnation resin is in a solvent medium.

21. (New) The process according to Claim 6, wherein the resin is a solvent-free resin of the type selected from the group consisting of a silicone type and an epoxy type.

22. (New) The process according to Claim 6, wherein the solvent-free resin is made of a material that belongs to the family of DGEBA resins.

23. (New) The process according to Claim 8, wherein the accelerator is a compound selected from the group consisting of a nitrogen compound and an organometallic compound.

24. (New) The process according to Claim 9, wherein the accelerator is a compound selected from the group consisting of a nitrogen compound and an organometallic compound.

25. (New) The process according to Claim 13, wherein the mica sheet is prepared from muscovite that has been calcined.

26. (New) The micaceous product according to Claim 14, wherein the micaceous product is a mica tape.

27. (New) The micaceous product according to Claim 14, wherein the resin content of the micaceous product is between 4% and 8% relative to the total weight of said micaceous product.

**REMARKS**

Claims 1-17 have been amended solely to claim the invention according to conventional practice before the United States Patent and Trademark Office. Claims 1-15 are modified from the Amendment made under Article 34 and Claims 16-17 are modified from the claims as originally filed in the international application. The subject matter of new claims 18-27 is derived from subject matter present in the original claims, and thus do not present any new matter. As a result of the present amendment, Claims 1-27 are presented for examination. . Should there be any questions concerning this application, the Examiner is respectfully invited to contact the undersigned attorney at the telephone number appearing below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated:

14 Dec. 2000

By:

Daniel Altman

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PROCESS FOR MAKING A MICACEOUS PRODUCT PREFERABLY IN  
THE FORM OF A MICA TAPE, AND PRODUCT OBTAINED

Subject of the invention

5           The present invention relates to the preparation of a micaceous product preferably in the form of a mica tape comprising a support coated with a solvent-free resin, combined with a mica sheet.

10           More specifically, the present invention relates to a process for preparing a mica tape which is capable of being impregnated subsequent to the preparation process itself.

15           The present invention also relates to a novel micaceous product.

Technical background of the invention

20           The electrical and optionally thermal insulation of copper components of electric engines, such as rods or coils, is achieved by taping up the said parts using micaceous products, more specifically micaceous tapes.

25           These micaceous tapes are in the form of a support impregnated with a resin, for example an epoxy resin, combined with a mica sheet. This mica sheet may be mica paper, optionally reinforced with a small amount of resin, for example epoxy resin.

          Two main families of these tapes exist.

30           The first family comprises tapes known as "saturated tapes" or "prepregs", which are tapes manufactured from mica paper that is highly impregnated with a resin of Novolac type and having a glass fabric as support. The resin content is usually between 30% and 40% relative to the total weight of the tape.

35           During manufacture, the epoxy resin is brought to stage B, i.e. it has already undergone curing. Next, this type of product may be taped around the part to be insulated and will then undergo a heat treatment of about from 160°C to 180°C.

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Document JP-07 149 928 discloses a product in the form of a saturated mica tape manufactured conventionally. It appears that a solvent-free epoxy resin is then used in the second phase of the manufacture, i.e. after taping the tape around the machine, in order to obtain adequate electrical insulation.

Document EP-A-0 735 071 discloses a solvent-free resin composition optionally intended for manufacturing a micaceous tape of saturated type, i.e. a tape which is already totally impregnated and consequently has a relatively high resin content.

Document GB-A-2 083 849 discloses a process for preparing insulating tapes, which consists in impregnating a mica support at room temperature using a solvent-free resin, followed by attachment to a support and heating of the assembly so as to reduce the viscosity of the resin, which will promote the deep impregnation of the mica paper. A tape of "prepreg" type which is hence already highly impregnated will thus again be obtained.

The second family comprises so-called "porous" tapes, which have a relatively low resin content of between about 4% and 10% relative to the total weight of the tape. These tapes are capable of being impregnated subsequent to the process for manufacturing the said tapes and will be subjected, after taping up, to a "VPI (vacuum pressure impregnation)" treatment, which makes it possible in a second phase to carry out an impregnation with a resin which is usually solvent-free. The "VPI" treatment consists in immersing in the impregnation resin the copper parts taped up with the porous mica tape, while applying vacuum in order to remove any infiltrated air; next, the vacuum is broken and a certain pressure is applied for several hours in order to make the post-impregnation resin penetrate into the mica insulant. The prosecution of the entire post-impregnation process and the temperature of the resin are set by the nature of this resin, the

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thickness of the insulation to be impregnated and the porosity of the mica tape used.

Before taping up, very flexible, non-adhesive dry tapes are obtained, which are distinguished by truly exceptional absorption capacity. They are consequently used for high-voltage machines (of up to 1000 MVA).

To prepare such tapes of the second family which are considered as capable of being impregnated, the "spraying" technique is known, which consists in spreading and impregnating a mica paper with an epoxy resin in solvent medium and then combining it with a support.

To prepare tapes capable of being impregnated, it is also known practice to use techniques of dusting a solid resin either on a mica sheet or directly onto the support, and then to attach the two components under pressure and heat. In particular, the publication EP-A-0 194 974 discloses a process for preparing thin mica tapes capable of being impregnated and comprising an incorporated accelerator, characterized in that a thin mica sheet is dusted with a powdered varnish free of hardener, next either the side of the thin mica sheet dusted with the varnish is bonded under pressure or heat with a glass fabric or a felt serving as support, or a glass fabric is impregnated with a liquid accelerator or a solution of a liquid or solid accelerator in a low-boiling solvent and the support thus obtained is bonded under pressure and heat with one side of the mica sheet dusted with varnish, and the laminate obtained is then impregnated with a liquid accelerator or a solution of a liquid or solid accelerator in a low-boiling solvent. Another possibility consists in impregnating a mica sheet with a liquid accelerator or a solution of a liquid or solid accelerator in a low-boiling solvent, in next dusting the impregnated mica sheet with a powdered varnish free of hardener, and then either in impregnating a glass fabric with a liquid accelerator or solution of a

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liquid or solid accelerator in a low-boiling solvent and bonding the support thus obtained under heat and pressure with the side of the thin mica sheet which has been dusted with powdered varnish, or in bonding the  
5 felt serving as support under pressure and heat with the side of the thin mica sheet which has been dusted with powdered varnish. However, it is observed that by using this process, the dusting operation with a varnish requires the use of a certain amount of  
10 varnish. In particular, the varnish will have a tendency, when it has been dusted onto the support, to pass through the mesh and be found on both faces of the support.

15 Aims of the invention

The present invention aims to provide a process for manufacturing micaceous products capable of being impregnated, which requires the use of a low content of resin.

20 The present invention aims to provide a technique for avoiding the use of solvents for the preparation of micaceous products capable of being impregnated, such as mica tapes of porous type.

The present invention aims also to allow the  
25 preparation of such tapes which have increased flexibility while at the same time having sufficient or even increased adhesion properties.

In addition, the present invention aims to provide in the specific case of preparing rolled-up  
30 tapes, a process which avoids the problem of bonding between successive turns.

Main characteristic elements of the invention

The present invention relates firstly to a  
35 process for preparing a micaceous product capable of being impregnated, which is preferably in the form of a mica tape obtained by combining a support and a mica sheet, characterized in that:

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- the support or the mica sheet is coated with a resin or an adhesive or alternatively a mixture of solvent-free resins, with the aid of coating cylinders at a working temperature for the coating operation,
- the support is combined with the mica sheet, and
- they are subjected to a pressure and temperature treatment at a second working temperature.

The expression "working temperature of the coating operation" should be understood as meaning the temperature to which the mixture of solvent-free resin is brought in order to be able to coat the support or the mica sheet. This temperature is usually between 40°C and 200°C. This means that the resin should be in a non-solid form, i.e. in the more or less viscous or liquid form.

The expression "a pressure and temperature treatment" means a treatment at a temperature of between 40°C and 200°C for a pressure of between 0 and 20 bar in order to allow attachment of the support to the mica sheet.

Among the possible examples of resin intended for coating which may be mentioned are solvent-free epoxy resins, solvent-free silicone adhesives or any other solvent-free resin which is of adequate viscosity at the working temperatures of the coating operation.

The support may be either a film or a fabric, or even a felt. The mica sheet is preferably a conventional mica paper manufactured according to the usual papermaking techniques. This mica paper may be a 100% mica paper or optionally a mica paper which has been reinforced beforehand with an impregnation resin, for example an epoxy resin, by a conventional implementation process such as impregnation by coating optionally in solvent medium.

It may be envisaged to incorporate an accelerator either with the resin used for the coating or during a prior step during the preparation of the mica sheet into the so-called impregnation resin, or

alternatively directly onto the support or onto the mica sheet itself.

In the first embodiments, the accelerator is mixed directly with the resin.

5 In general, it may be envisaged to use an accelerator which is in the form of a nitrogen compound such as an amine or an organometallic compound such as zinc naphthanate, or any other compound having the desired catalytic effect.

10 A second object of the present invention relates to a micaceous product capable of being impregnated, which is preferably in the form of a so-called porous mica tape and which comprises, on the one hand, a support impregnated by solvent-free coating  
15 with a resin and a mica sheet, or alternatively a mica sheet impregnated by solvent-free coating with a resin and the support itself, these two components being attached to each other.

It is observed that when the support is a  
20 fabric, there will be deposits of resin essentially on the intersections of the yarns of the weft with those of the warp. More specifically, traces of resin will be observed exclusively at the intersections where the weft yarn superimposes the warp yarn. This makes it  
25 possible to obtain, in a particularly advantageous manner, very precise control of the resin content on the finished tape, this resin content being very much lower than that for the products obtained by the processes of the prior art (spraying or use of a solid  
30 powder). This also makes it possible to maintain or even enhance the flexibility properties and to limit the risks of bonding between turns when the tape is rolled up.

The fabric will preferably be a fabric or a  
35 silk made of woven glass fibres, having a weight per unit area of from 20 g/m<sup>2</sup> to 50 g/m<sup>2</sup>. The mica sheet, and preferably the mica paper, has a weight per unit area of between 100 g/m<sup>2</sup> and 250 g/m<sup>2</sup>.

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Brief description of the figures

- Figure 1 represents a schematic view of the device designed to carry out the coating process according to the present invention.
- 5 Figure 2 represents a schematic view of the second step of the process for preparing a micaceous tape according to the present invention, which consists in attaching the support to the mica paper.
- 10 Figure 3 represents a schematic description of a glass fabric impregnated by the technique described.

Description of several preferred embodiments of the invention

- Figure 1 represents a schematic view of a device designed to carry out the process according to the invention. This device firstly comprises a coating station consisting essentially of several successive
- 20 rollers, and preferably four rollers (1, 2, 3 and 4), which allow the coating of the support with a very small amount of resin.

- This coating unit is followed by a lamination unit which brings the two components, that is to say
- 25 the mica sheet and the support, in contact and which exerts on the assembly a pressure and temperature action as described in Figure 2. This pressure action is achieved using two rollers (5 and 6). Preferably, only one of the two rollers will be heated.

- 30 The examples which follow describe more specifically two embodiments of the process according to the present invention.

Examples

35 Example 1

A mica tape is prepared by hot-coating a glass fabric support using a solvent-free resin and the coated support is laminated onto a mica paper. The following materials are used to do this:

- 1) An unmodified epoxy resin based on bisphenol A and epichlorohydrin. This is a solvent-free resin which is solid at room temperature. This resin has an epoxy-equivalent weight of between 350 and 400 g/equiv. and a viscosity at 90°C of about 4000 mPa.s.
- 2) A glass fabric with a weight per unit area of 24 g/m<sup>2</sup> consisting of 26 warp yarns/cm and 15 weft yarns/cm, the yarn count being 5.5 tex in warp and in weft.
- 3) A mica paper of muscovite type with a weight per unit area of 160 g/m<sup>2</sup> which is reinforced beforehand with 4 g/m<sup>2</sup> of epoxy resin containing an accelerator of metal salt type. The addition of the epoxy resin and the accelerator to the mica paper is carried out conventionally, i.e. by impregnation in solvent medium.

The process is performed as follows to prepare the mica tape:

- A) The epoxy resin is preheated in an oven to 90°C. When the resin has reached this temperature and is sufficiently fluid, an adequate amount is poured between the rollers 1 and 2 of the coating station described in Figure 1. The rollers 1 and 3 of the coating station have been preheated to 90°C and are maintained at this temperature throughout the coating operation. The rotation speeds and the gap between the various rollers of the coating stand are adjusted so as to transfer a thin layer of resin from roller 2 to roller 3 and from roller 3 to roller 4.
- B) The glass fabric is rolled out and brought into tangential contact with the roller 4 of the coating stand as described in Figure 1. The glass fabric carries along some of the resin which is on the roller 4.
- C) Separately, the mica paper is rolled out and placed in contact, in the laminating unit described in Figure 2, with the coated glass

fabric. The roller 5 has been preheated to 80°C. A pressure of 20 bar is applied by roller 6 on roller 5 so as to attach the mica paper to the support in order to obtain a micaceous tape.

- 5 D) The micaceous tape thus obtained is rolled up.

With the settings used in the example, a deposit of about 4 to 5 g/m<sup>2</sup> of epoxy resin is obtained on the glass fabric, which is equivalent to a content of about 2% relative to the total weight of the tape.

- 10 If the resin used beforehand in the mica paper is taken into account, a finished tape with a resin content of between 3.5% and 4% relative to the total weight of the tape will be obtained.

- When a sample of the coated glass fabric as  
15 described above is examined with binoculars or a microscope, resin is found to be present only at the intersections between the warp yarns and the weft yarns and more specifically only at the intersections where the weft yarns superimpose the warp yarns, that is to  
20 say at one intersection out of 2 as described in Figure 3. It is also found that there is no transfer of resin onto the other face of the glass fabric.

- The characteristics of a mica tape thus prepared (tape A) are summarized in Table I and  
25 compared with those of a tape manufactured by the conventional spraying technique in solvent medium (tape B). It is found that tape A manufactured according to the process described above has a resin content which is lower than the level normally required  
30 for a tape B manufactured by the conventional spraying technique in solvent medium. Furthermore, tape A is more flexible and has greater porosity and better tensile strength than tape B. Tape A is also totally dry on the outer face of the glass fabric, given that  
35 the resin is located only at the interface between the glass fabric and the mica paper; this characteristic limits the risks of bonding between turns of the rolled-up tape.



Example 2

A mica tape is prepared by hot-coating according to the same technique as described in Example 1. The following materials are used to do this:

- 5 1) An unmodified epoxy resin based on bisphenol A and epichlorohydrin. This is a solvent-free liquid resin which has a high viscosity at room temperature. This resin has an epoxy-equivalent weight of between 235 and 265 g/equiv. and a  
10 viscosity at 90°C of about 300 mPa.s.
- 2) A polyester film 23 µm thick.
- 3) A mica paper of muscovite type with a weight per  
15 unit area of 180 g/m<sup>2</sup>, reinforced beforehand with 5 g/m<sup>2</sup> of epoxy resin by impregnation in solvent medium.

To prepare the mica tape, the process is performed in the same way as in Example 1, replacing the glass fabric with the polyester film.

20 With the settings used in the example, a deposit of about 4 g/m<sup>2</sup> of epoxy resin is obtained on the polyester film. The mica tape thus prepared is extremely flexible and the adhesion between the polyester film and the mica paper is very good.

25

Table I

| Characteristics                       | Unit             | Tape A | Tape B |
|---------------------------------------|------------------|--------|--------|
| Weight                                | g/m <sup>2</sup> | 189.5  | 198    |
| Content of binder by loss on ignition | g/m <sup>2</sup> | 9.7    | 14.8   |
| Thickness                             | mm               | 0.13   | 0.13   |
| CEI flexibility                       | N/m              | 24     | 30     |
| Porosity on the mica side             | sec              | 299    | 350    |
| Porosity on the support side          | sec              | 208    | 300    |
| Tensile strength                      | Kg/cm            | 9.8    | 8.5    |
| Puncture at 70°C                      | sec              | 30     | 40     |

CLAIMS

1. Process for preparing a micaceous product capable of being impregnated, which is preferably in the form of a mica tape obtained by combining at least one support and a mica sheet, characterized in that:
- the support or the mica sheet is coated with a solvent-free resin or a mixture of solvent-free resins, with the aid of several coating rollers at a working temperature for the coating operation,
  - the support is combined with the mica sheet, and
  - they are subjected to a pressure and temperature treatment.
2. Process according to Claim 1, characterized in that a micaceous product whose resin content is between 1% and 10% and preferably between 4% and 8%, relative to the total weight of the tape, is prepared.
3. Process according to Claim 1 or 2, characterized in that the working temperature of the coating operation is between 40°C and 200°C.
4. Process according to any one of the preceding claims, characterized in that the pressure and temperature treatment is carried out at between 40°C and 200°C for a pressure of between 0 and 20 bar.
5. Process according to any one of the preceding claims, characterized in that a small amount of impregnation resin, optionally in solvent medium, is incorporated into the mica sheet, prior to the coating step.
6. Process according to any one of the preceding claims, characterized in that the resin intended for the coating operation is a resin whose melting point is lower than the working temperature.
7. Process according to any one of the preceding claims, characterized in that the resin is a solvent-free resin preferably of silicone or epoxy type and more particularly belonging to the family of DGEBA resins.

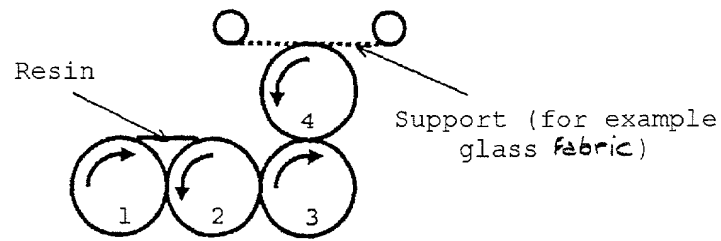
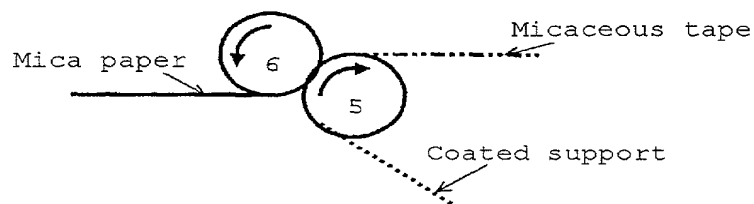
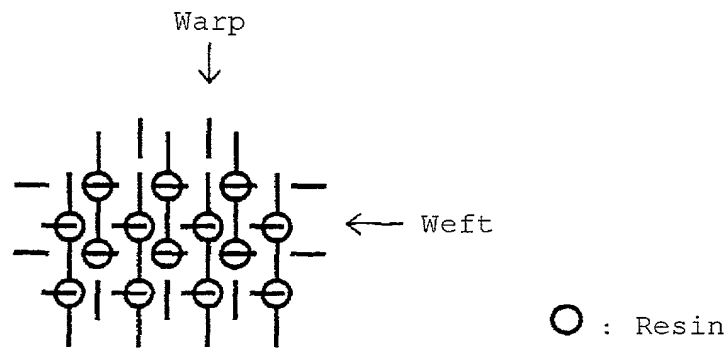
9. Process according to any one of the preceding  
5 claims, characterized in that an accelerator is  
incorporated into the mica sheet.

10 11. Process according to any one of the preceding  
claims, characterized in that the accelerator is a  
nitrogen compound or an organometallic compound.

13. Process according to any one of the preceding claims, characterized in that the mica sheet is a mica paper which is preferably reinforced beforehand with an impregnation resin.

25 15. Micaceous product capable of being impregnated,  
which is preferably in the form of a mica tape,  
comprising a support coated with a solvent-free resin  
combined with a mica sheet.

17. Micaceous product according to Claim 15 or 16,  
characterized in that the support is a fabric on which  
the resin deposits appear essentially on the weft yarns  
35 at the intersection with the warp yarns.

Figure 1Figure 2Figure 3



**Declaration and Power of Attorney for Patent Application**

**Déclaration et Pouvoirs pour demandes de brevet**

**French Language Declaration**

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que :

Mon domicile, mon adresse postale et ma nationalité figurant ci-dessous à côté de mon nom,

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) du sujet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée :

***PROCEDE DE REALISATION D'UN PRODUIT MICACE SE PRESENTANT DE PREFERENCE SOUS LA FORME D'UN RUBAN DE MICA ET PRODUIT OBTENU.***

et dont les caractéristiques sont fournies ci-joint à moins que la case suivante n'ait été cochée :

- ☐ a été déposé le  
sous le numéro de Demande des Etats-Unis ou  
sous le numéro de demande internationale  
PCT et modifiée le  
(le cas échéant).

Je déclare par le présent acte avoir passé en revue et pris connaissance du contenu des caractéristiques ci-dessus, revendications comprises, telles que modifiées par tout amendement dont il aura été fait référence ci-dessus.

Je reconnais de voir divulguer toute information pertinente à l'examen de cette demande, comme le définit le Titre 37, §1.56 du Code fédéral des réglementations.

As a below named inventor, I hereby declare that :

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled :

***METHOD FOR MAKING A MICACEOUS PRODUCT PREFERABLY IN THE FORM OF A MICA RIBBON AND RESULTING PRODUCT***

the specification of which is attached hereto unless the following box is checked :

- ☐ was filed on 18 February 1999  
as United States Application Number or PCT  
International Application Number  
***PCT/BE99/00077 filed on 17/06/1999*** and  
was amended on  
(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

## French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119 du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur figurant ci-dessous et ai aussi pris connaissance de toute demande étrangère de brevet ou de tout certificat d'inventeur ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

### Prior foreign applications

Demande(s) de brevet antérieure(s)

|                     |           |
|---------------------|-----------|
| (Number)            | (Country) |
| (Numéro)            | (Pays)    |
| <b>98 870 136.3</b> | <b>EP</b> |
| (Number)            | (Country) |
| (Numéro)            | (Pays)    |
| (Number)            | (Country) |
| (Numéro)            | (Pays)    |

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis figurant ci-dessous et, dans la mesure où le sujet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande américaine préalable, en vertu des dispositions de premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la demande de brevet comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont j'ai pu disposer entre la date de dépôt de la première demande et la date de dépôt de la demande nationale ou PCT internationale :

|                              |                 |
|------------------------------|-----------------|
| (Application Serial No.)     | (Filing date)   |
| (No. de série de la demande) | (Date de dépôt) |

|                              |                 |
|------------------------------|-----------------|
| (Application Serial No.)     | (Filing date)   |
| (No. de série de la demande) | (Date de dépôt) |

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby claim foreign priority under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

### Priority claimed Droit de priorité revendiqué

|                            |                                  |                       |
|----------------------------|----------------------------------|-----------------------|
| 26/02/1998                 | <input type="radio"/>            | <input type="radio"/> |
| (Day/Month/Year Filed)     | Yes                              | No                    |
| (Jour/Mois/Année de dépôt) | Oui                              | Non                   |
| <b>17/06/1998</b>          | <input checked="" type="radio"/> | <input type="radio"/> |
| (Day/Month/Year Filed)     | Yes                              | No                    |
| (Jour/Mois/Année de dépôt) | Oui                              | Non                   |
|                            | <input type="radio"/>            | <input type="radio"/> |
| (Day/Month/Year Filed)     | Yes                              | No                    |
| (Jour/Mois/Année de dépôt) | Oui                              | Non                   |

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application :

|                               |                                |
|-------------------------------|--------------------------------|
| (Statut)                      | (Status)                       |
| (Breveté, en attente, annulé) | (Patented, pending, abandoned) |

|                               |                                |
|-------------------------------|--------------------------------|
| (Statut)                      | (Status)                       |
| (Breveté, en attente, annulé) | (Patented, pending, abandoned) |

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful and false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of any patent issued thereon.

## French Language Declaration

POUVOIRS : En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'il(s) poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire avec le Bureau des brevets et marques s'y rapportant.

(mentionner le nom et le numéro d'enregistrement)

POWER OF ATTORNEY : As named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and trademark Office connected there with.


(list name and registration number)

Adresser toute correspondance à :

Send Correspondence to :

Adresser tout appel téléphonique à :  
(nom et numéro de téléphone)

Direct Telephone Calls to :  
(name and telephone number)

|  |                       |  |          |
|--|-----------------------|--|----------|
| Nom complet de l'unique ou premier inventeur |                       | Full name of sole or first inventor  |          |
| 1-01   |                       | JACQUES Alain  |          |
| Signature de l'inventeur                     | Date                  | Inventor's signature   | Date     |
|  |                       |  | 19/07/01 |
| Domicile                                     | Residence             |  |          |
|  | Rue des Verreries 117 |  |          |
|  | B- 5100 JAMBES        |  |          |
| Nationalité                                  | Citizenship           |  |          |
|  | BELGIAN               |  |          |
| Adresse postale                              | Post Office Address   |  |          |
|  | Rue des Verreries 117 |  |          |
|  | B- 5100 JAMBES        |  |          |

(Fournir les mêmes renseignements et la signature de tout co-inventeur supplémentaire)

(Supply similar information and signature for any subsequent joint inventor)

|  |      |   |                         |
|--|------|---|-------------------------|
| Nom complet du second co-inventeur, le cas échéant<br><i>M</i> |      | Full name of second joint inventor, if any<br><b>MORTIER Noël</b>                             |                         |
| Signature du second inventeur                                  | Date | Second inventor's signature<br><i>[Signature]</i>   | Date<br><b>19/01/01</b> |
| Domicile   |      | Residence<br><b>Ter Linde 4</b><br><b>B- 9052 GENT ZWIJNAARDE</b><br><b>BELGIUM</b>           |                         |
| Nationalité  |      | Citizenship<br><b>BELGIAN</b>   |                         |
| Adresse postale  |      | Post Office Address<br><b>Ter Linde 4</b><br><b>B- 9052 GENT ZWIJNAARDE</b><br><b>BELGIUM</b> |                         |

|   |      |   |      |
|---|------|---|------|
| Nom complet du troisième co-inventeur, le cas échéant |      | Full name of third joint inventor, if any |      |
| Signature du troisième inventeur                      | Date | Third inventor's signature                | Date |
| Domicile  |      | Residence                                 |      |
| Nationalité   |      | Citizenship                               |      |
| Adresse postale                                       |      | Post Office Address                       |      |

|   |      |  |      |
|---|------|--|------|
| Nom complet du quatrième co-inventeur, le cas échéant |      | Full name of fourth joint inventor, if any |      |
| Signature du quatrième inventeur                      | Date | Fourth inventor's signature                | Date |
| Domicile  |      | Residence                                  |      |
| Nationalité   |      | Citizenship                                |      |
| Adresse postale                                       |      | Post Office Address                        |      |